

## CONDITIONING COTTON FOR DEFOLIATION

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During 1972, a growth regulator chemical, Pennwalt TD-1123 (3,4-dichloroisothiazole-5-carboxylic acid) was included in crop termination tests on cotton. It was also included in the following years where we noted that the efficiency of chemical defoliation was greatly improved on plots previously treated with TD-1123. In a termination experiment during 1974 rates of TD-1123 varying by .5 lb/A were applied during late August in combination with chlorflurenol at .5 lb/A. Rates of TD-1123 ranged from .5 to 2.0 lb/A. At the higher rates much defoliation occurred even before the application of a commercial defoliant. After the defoliant was applied a high leaf-drop was obtained even on plots treated with the lowest rate of TD-1123 (.5 lb/A).

During 1975 an experiment was conducted at the Cotton Research Center, Phoenix, Arizona to evaluate the potential of TD-1123 as a conditioner for defoliation. TD-1123 was applied at rates of .2, .35 and .5 pounds in 12 gallons water per acre. Applications were made on five dates (approximate weekly intervals) varying from one month to one day before application of a commercial defoliant (DEF-6) at 1.5 pts/A. An unseasonably early frost on October 24 and 25 in addition to excessively rank cotton growth (up to seven feet) served to detract from anticipated results.

At each rate of TD-1123 application, cotton foliage became decidedly reddened five-seven days following application, indicating an accumulation of anthocyanin. When applied at .5 lb/A there was an evident decrease in boll formation. Flowers usually shed three-four days after opening. A decrease (not significant) in seed cotton production was noted on the two earliest application dates. Foliage harvested one week after the applications of September 19 indicated no change in the content of fructose, glucose or sucrose. Starch content was somewhat variable but tended to be higher in treated foliage. Analysis of petioles indicated that treatment decreased sugar content, all three rates being about equally effective.

Efficiency of the defoliant was improved as compared to plots not treated with TD-1123 but was better as rates were increased. Best response to the defoliant application occurred when TD-1123 was applied at least one week ahead of the defoliant. Results of defoliant application have been variable and frequently unpredictable. The potential of TD-1123 to condition cotton plants for consistent leaf-drop appears encouraging. With proper timing there should be no adverse effect on the yield of seed cotton.

## COTTON DEFOLIATION

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A field of cotton at the Cotton Research Center, Phoenix, was divided into two equal areas to study the effect of date of application of harvest-aid chemicals and leaf-drop. The cotton was green, rank, and four to six feet tall. These conditions result in cotton that is typically difficult to defoliate.

In general, one application of harvest-aid chemicals did not provide adequate defoliation at either application date. Harvest-aid chemicals applied at the later date when the cotton was approaching maturity provided better defoliation than the early date.

Defoliants were applied to four row plots with a high-boy applicator equipped with five nozzles per row. Total volume of solution was 24 gallons per acre and spray pressure 40 psi.

Early Application Date: September 22, 1975. Plots were evaluated by four individuals on October 7. Results below are an average of the ratings.

Percentage leaf-drop	Chemical <sup>1/</sup>	Rate per acre
62 a <sup>2/</sup>	DEF-6 w/surfactant	2 pts
58 ab	DEF-6 and Bollseye w/surfactant	2 pts and 1 pt
56 ab	Bollseye	3 pts
56 ab	DEF-6 and Bollseye w/surfactant	3 pts and 3 pts
53 ab	Tumbleleaf	2 gal
51 ab	Sodium chlorate and Bollseye w/surfactant	2 gal and 1 pt
50 ab	Sodium chlorate and Bollseye w/surfactant	1 gal and 3 pts
49 ab	Sodium chlorate and Bollseye w/surfactant	2 gal and 2 pts
47 ab	Sodium chlorate w/surfactant	2-1/2 gal
46 ab	Bollseye w/surfactant	3 pts
46 ab	DEF-6 and Red-Top nonphytotoxic oil	2 pts and 1 pt
46 ab	DEF-6 and accelerate w/surfactant	2 pts and 1-1/2 pts
45 ab	Sodium chlorate and accelerate w/surfactant	2-1/2 gal and 1 pt
45 ab	DEF-6 and Bollseye w/surfactant	1 pt and 2 pts
44 ab	Bollseye w/surfactant	1 gal
44 ab	DEF-6 and Paraquat w/surfactant	2 pts and 1-1/2 pts
43 ab	Nor Am SN49537	1/8 lb
43 ab	Sodium chlorate	2-1/2 gal
39 ab	DEF-6 and Red-Top nonphytotoxic oil	2 pts and 2 pts
39 ab	DEF-6 and Bollseye w/surfactant	1-1/2 pts and 1-1/2 pts
36 bc	DEF-6	2 pts
33 bc	Tumbleleaf	1 gal
33 bc	Nor Am SN49537 w/surfactant	1/4 lb
33 bc	Nor Am SN49537 w/surfactant	1/8 lb
18 c	Check	

<sup>1/</sup>Surfactant added at .5% v/v

<sup>2/</sup>Means not followed by the same letter are significantly different at 5% probability.

Late Application Date: October 16, 1975, plots were evaluated by three individuals on November 5. Results below are an average of the ratings.

Percentage leaf-drop	Chemical <sup>1/</sup>	Rate per acre
74 a <sup>2/</sup>	DEF-6 and Paraquat w/surfactant	2 pt and 1 pt
70 ab	Sodium chlorate and Paraquat w/surfactant	2-1/2 gal and 1 pt
68 abc	Sodium chlorate and Bollseye w/surfactant	1 gal and 3 pts
64 abc	DEF-6 and Bollseye w/surfactant	3 pts and 3 pts
61 abc	Sodium chlorate and Paraquat w/surfactant	2-1/2 gal and 1/2 pt
56 abc	Sodium chlorate and accelerate w/surfactant	2-1/2 gal and 1 pt
55 abc	DEF-6 and Paraquat w/surfactant	2 pts and 1/2 pt
55 abc	Sodium chlorate and Bollseye w/surfactant	2 gal and 2 pts
54 abc	DEF-6	2 pts
53 abc	Bollseye w/surfactant	1 gal
50 abcd	Bollseye w/surfactant	3 pts
49 abcd	DEF-6 and Bollseye w/surfactant	1 pt and 2 pts
48 abcd	Nor Am SN49537 w/surfactant	1/2 lb
48 abcd	DEF-6 Bollseye w/surfactant	1-1/2 pts and 1-1/2 pts
47 abcd	Sodium chlorate and Bollseye w/surfactant	2 gal and 1 pt
46 abcd	DEF-6 and accelerate w/surfactant	2 pts and 1-1/2 pts
46 abcd	Sodium chlorate w/surfactant	2-1/2 gal
46 abcd	DEF-6 and Red-Top nonphytotoxic oil	2 pts and 2 pts
46 abcd	Tumbleleaf	1 gal
46 abcd	DEF-6 and Red-Top nonphytotoxic oil	2 pts and 1 pt
45 abcd	DEF-6 and Bollseye w/surfactant	2 pts and 1 pt
42 abcd	Sodium chlorate	2-1/2 gal
40 abcd	Tumbleleaf	2 gal
36 bcd	Nor Am SN49537 w/surfactant	1/8 lb
36 bcd	DEF-6 w/surfactant	2 pts
35 bcd	Nor Am SN49537	1/4 lb
34 cd	Bollseye	3 pts
18 d	Check	1/2 lb

<sup>1/</sup>Surfactant added at .5% v/v

<sup>2/</sup>Means not followed by same letter are significantly different at 5% probability.

#### HARVEST-AID CHEMICAL STUDIES

F.M. Carasso and R.E. Briggs

Cotton as grown in the major producing areas in Arizona has a tendency toward vigorous vegetative growth, which must be controlled before the application of harvest-aid chemicals in order to obtain satisfactory results. Since this condition is relatively difficult to achieve without sacrificing yield potential, Arizona cotton growers are often confronted with the problem of inadequate pre-harvest defoliation. The harvest-aid chemicals now available have not produced consistently satisfactory results, when applied at recommended rates, even after multiple applications.

Since 1967 we have been evaluating a wide variety of selected chemicals in replicated harvest-aid tests at the Yuma Valley Experiment Station. The primary objective of this research is to develop a consistently satisfactory formulation and procedure for cotton defoliation.

We have conducted several defoliation tests each year, involving different chemicals applied at various rates, singly and in mixtures. Investigation of chemical pre-conditioning treatments to facilitate defoliation was begun in 1973. For the last two years we have also investigated the use of U of A experimental surfactants, which were devised specifically for the purpose of increasing foliar absorption.